

Crater Density Tutorial #1; Overview

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This tutorial uses the ArcMap Server Web Application hosted at pigwad and directly called from the link <http://webgis.wr.usgs.gov/MarsCraterView/>

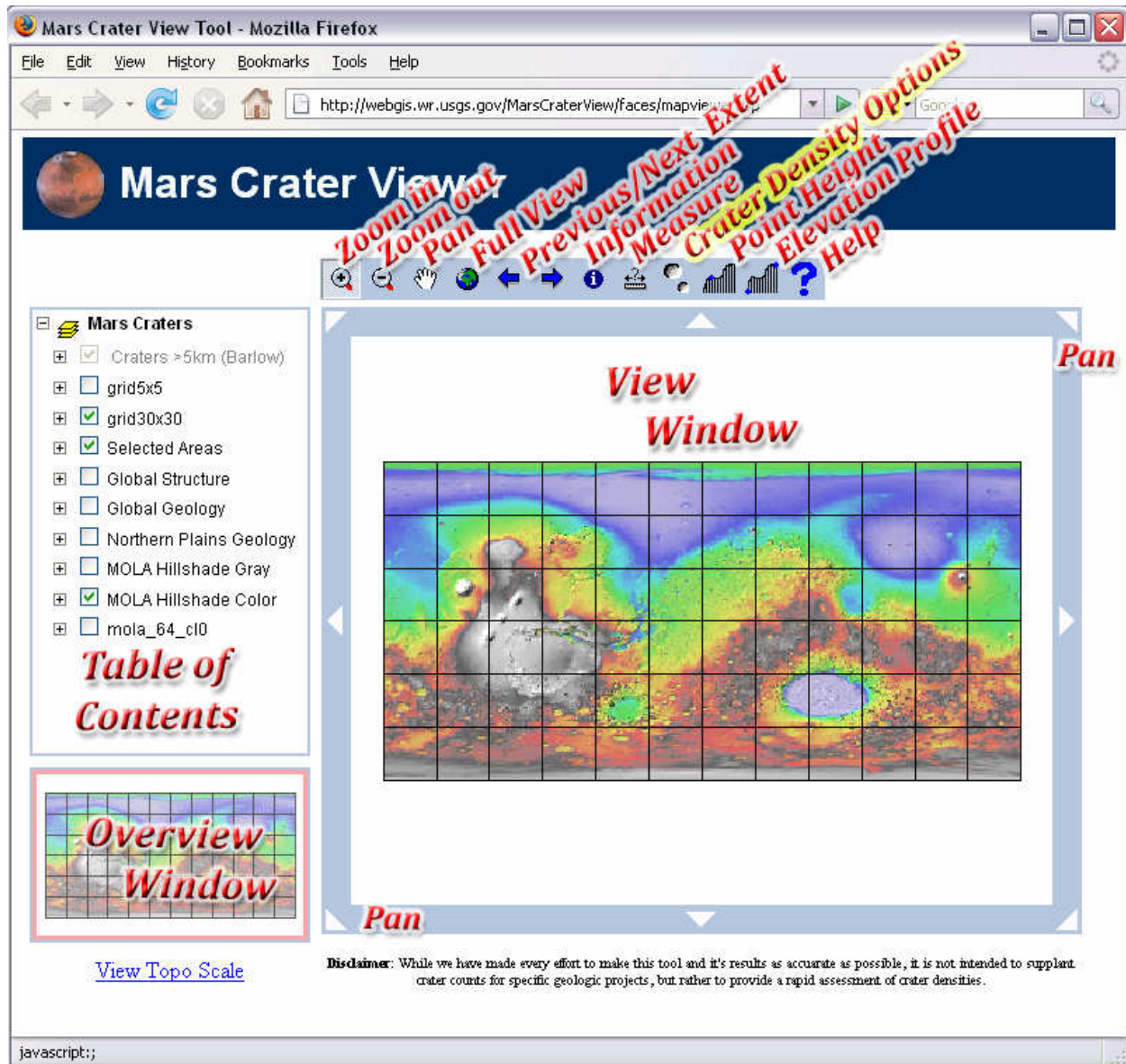
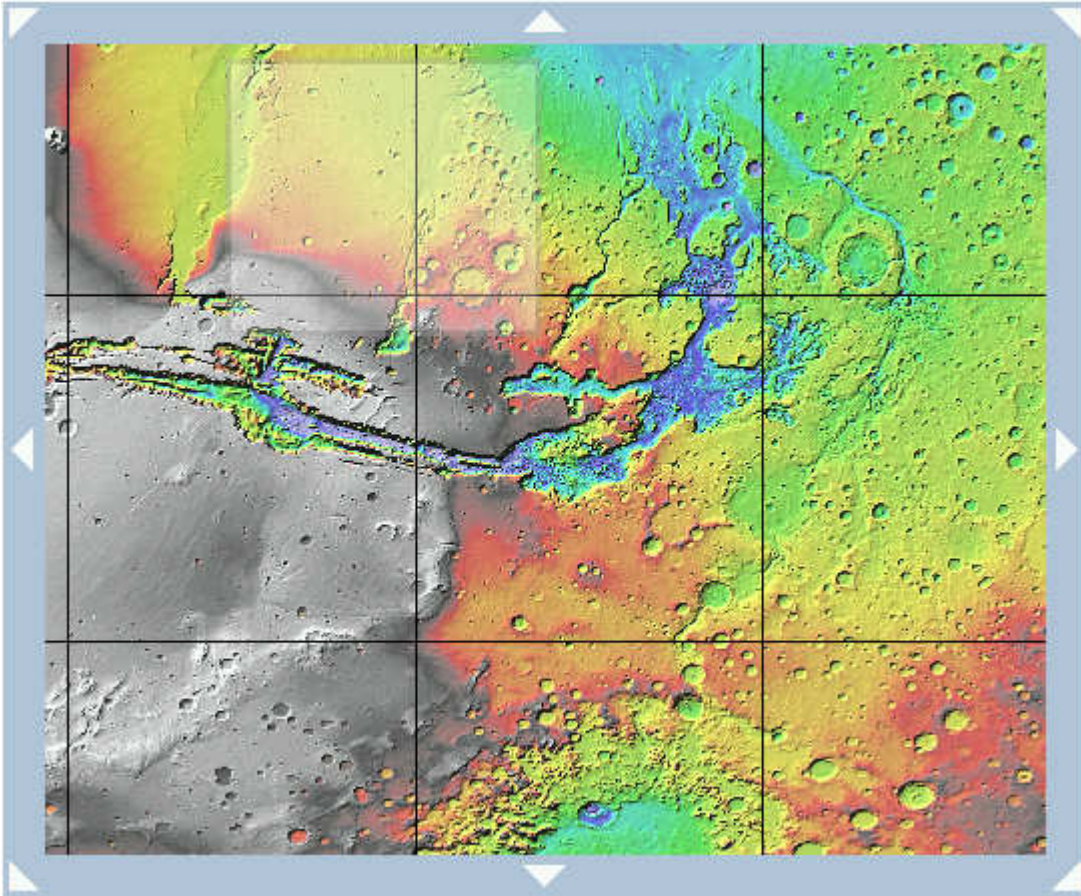


Figure 1 shows the application window for the Mars Crater Density tool. The red text shows the major areas and the button functionalities. The “View Window” is for the user to interact with the map. The “Table of Contents” area simply shows the layers which can be turned on/off and opened to view the layer’s symbology. The application has been mostly tested with Mozilla Firefox and will work the best in that browser.



Zoom/Pan/Extent Buttons



Figure 2 shows the zoom-in tool activated. You can click or drag a box, as shown, over your area of interest to zoom to the area. The zoom-out tool works the same. The pan tool can also be used as a single click or a click and drag the display over. The globe button sets the map to the full extent. The left blue arrows set the previous extent. Once you have returned to a previous extent you can then use the right arrow to go back.



The information button allows you to query the available vector layers. Select the button and click at the feature you are interested in. Once clicked, an interface, shown below, will open which will allow you to specify the different layers to query. This widow will float over the main interface but stay with in the webpage.

Identify Results

Identify Results

Find features in: Craters >5km (Barlow)

Features	Field	Value
<input type="checkbox"/> Craters >5km (Barlow)	FID	8401
11SE	SUBQUAD	11SE
11SE	ID	316
	LATITUDE	8.42
	LONGITUDE	-1.43
	DIAMETER	12.9
	TERRAIN	CrP
	TYPE	Rc
	EJECTA_MOR	No
	INTERIOR_M	No
	PIT_DIAMET	0
	MIN_DIAMET	0
	ANGLE	999
	COMMENTS	none

Close



This tool is a simple geodesic measure tool. Click to start and then continue to click to add vertices. When you are finished, double click to stop and the calculated geodesic distance will returned into a separate dialog window. Note this window can be moved next to the main viewer window and will display the results of all the crater tools.

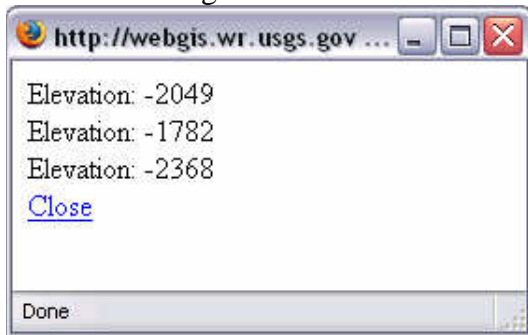
http://webgis.wr.usgs.gov ...

Click on the map to create a line you want to measure. Double click to end the line.
[Close](#)

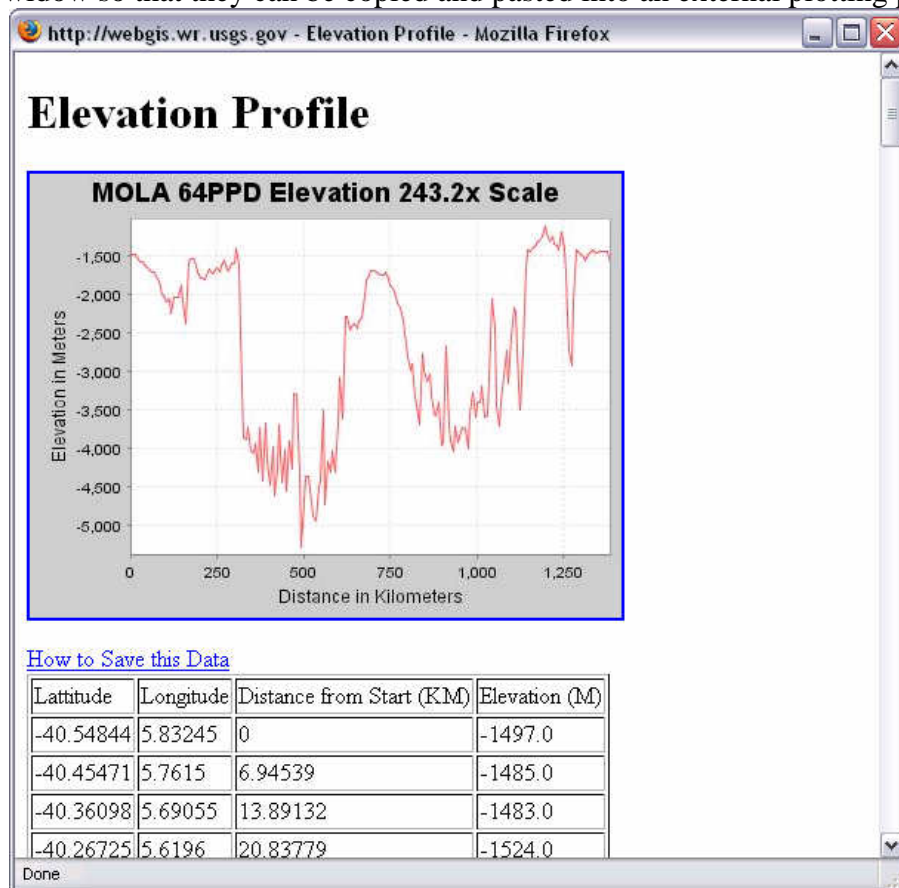
Done



The Elevation at a Point tool will return the MOLA elevation at the select point. The same dialog windows will hold the results.



The Elevation on a Line tool will return a profile. Click the map to define a line for the elevation profile. Double-click to complete the line. The results window will refresh with an elevation plot. Click on the plot to enlarge it to full size. In the larger window you can then choose a 5X or a 10X exaggeration. The vertices of the profile are listed in the main window so that they can be copied and pasted into an external plotting program.



Note: the profile (km) is calculated over a sphere and thus is accurate over long distances; however, only 200 vertices are used no matter the total distance. Tip: if pasting results in Excel, choose “Paste Special” and select “Text” to maintain the columns.



Crater Density Options tool. Once clicked, this will open a driver window with several options for calculating density plots. Here we will briefly explain the options and elaborate on specific cases in follow-on tutorials.

Crater Density Tool

Step 1 Select the area(s) you wish to analyze.

Selection Options
New Selection

Shape Type
☐ Custom Shape
☒ Existing Shape Northern Plains Geology
☐ Single Existing Shape
☐ Multiple Adjacent Existing Shapes
☐ Query
unit_name = metadata

Step 2 Select craters to include in this selection
All Craters metadata

Step 3 Select the type of results to display
☒ Basic Results
☐ Advanced Results - Cumulative
☐ Advanced Results - Relative

Done

Follow the dialog going through each step; 1, 2, and 3.

In step one, using the “Custom Shape” option, you can interact with View Window to draw one or iteratively add-to or subtract polygon(s) representing the area of interest to calculate the crater density plot. Using the “Existing Shape” option you can choose one or many existing polygons from the available geologic maps (Mars Global Geology or the Northern Plains Geology). By using the “Selection Options” pull-down you can add to or remove from the selected polygon set. The Query options lets you specify unique Units to select. Again you can use the “Selection Options” pull-down you can continue to add or remove a queried Unit from the selected set.

Step 2 Select craters to include in this selection

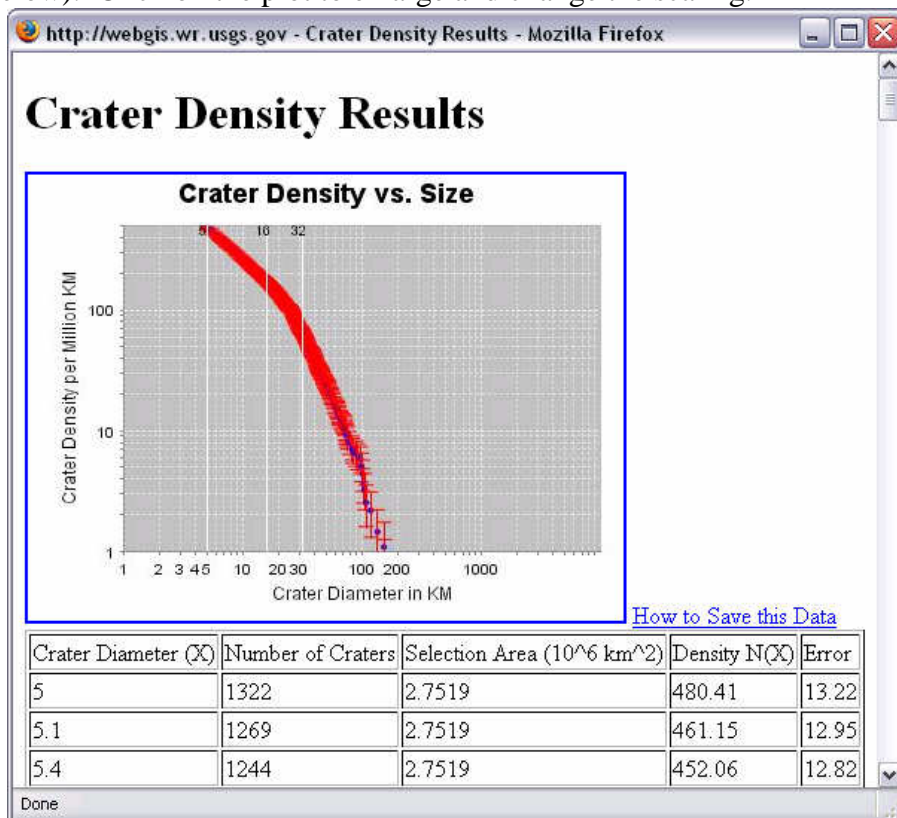
DIAMETER > 10 [metadata](#)

In step two, you can limit the craters from the Barlow crater catalog to intersect. In the example above we are only going to use diameters greater than 10 km. You can also limit the crater to certain types of craters as defined in the Barlow database. Please patient as the database is queried for possible options when a new query field is selected

Step 3 Select the type of results to display

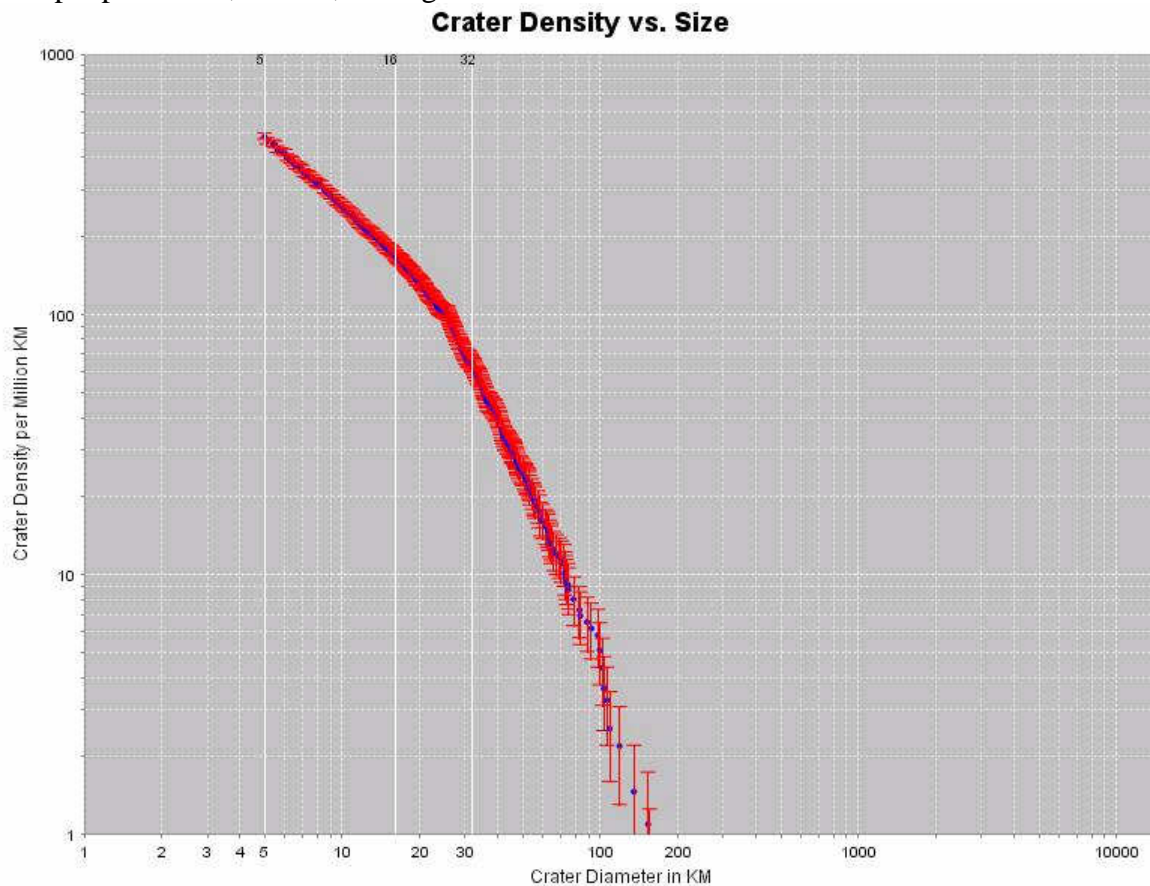
- ☒ Basic Results
☐ Advanced Results - Cumulative
☐ Advanced Results - Relative

Step 3 is where you choose the style of results to return. Once selected hit the “run Analysis” button.. The most commonly used of the three types is the Cumulative plot (shown below). Click on the plot to enlarge and change the scaling.



If you wish to change the results, select the “Start Over” button at the end of the window and choose another type. Tip: if pasting results in Excel, choose “Paste Special” and select “Text” to maintain the columns.

Example plot at a 1,000x15,000 log scale:



Troubleshooting:

If you run into the error below, the application has timed out. This is due to the fact that each user must have a locked access to edit the selected or drawn polygon(s) within the interface. Thus when there is a long pause in user inactivity, the session is released to make room for another user. The current time out is set about 5 minutes.

